



United States  
Department of  
Agriculture

Forest  
Service

Shasta-Trinity  
National Forests

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Subject: Biological Evaluation of Current Ponderosa Pine Mortality in Hirz Bay Campground, Shasta Lake RD, Shasta-Trinity NF (FPH Report No. N91-3)

To: Forest Supervisor, Shasta-Trinity NF

On January 28, 1991, Gregg DeNitto, pathologist, Dave Schultz, entomologist, and I visited the Hirz Bay Campground on Shasta Lake RD with Mary Ellen Grigsby and Bill Rametes from the district. They had observed mortality of ponderosa pine in the campground and had requested an evaluation to determine the cause of the mortality.

This campground is located on a peninsula on the McCloud arm of Shasta Lake. The elevation around the edges of the campground is about 1,100 ft. This elevation is close to the lower elevational limits for ponderosa pine in this area. This is a relatively dry site, which when combined with the ongoing drought, has caused stand vigor throughout the campground to decrease.

The stand is comprised of ponderosa pine, knobcone pine, live oak and California black oak. The radial growth of the overstory ponderosa pines has been declining for the last 25 years. There is very little ponderosa pine understory in most places. Shrubs are limited, although manzanita and poison oak are established in the few openings. There is some natural regeneration throughout the campground and seedlings have also been planted in some areas. The site is fully stocked with about 200 sq. ft. of basal area/acre.

Some of the overstory ponderosa pines have dead or declining crowns and extensive flagging. Twenty-six of the trees in this condition are marked for salvage. When we visited the campground, a few of the marked trees had already been cut and were in the process of being removed.

There are signs of unsuccessful attacks by red turpentine beetles, Dendroctonus valens, and western pine beetles, Dendroctonus brevicornis, in some trees. The lower boles of most of the marked trees have not yet been completely occupied by these beetles. As these trees come under attack by western pine beetle, additional beetles may be attracted by the aggregating pheromone released by the western pine beetles. These additional beetles could attack other pines within a 20-25 ft. radius from the pheromone source.

A number of the overstory pines in the center of the campground are infected by western dwarf mistletoe, Arceuthobium campylopodum. The level of infections in individual trees is low to moderate. Some of these trees have both scattered branch infections and witches' brooms. Dwarf mistletoe can have two effects on ponderosa pines in this campground. Dwarf mistletoe reduces tree vigor by utilizing food and water from the host. Witches' brooms cause significant drains on the trees in this respect. Heavily infected trees and those with numerous witches' brooms are especially susceptible to attack by bark beetles. Understory pines are readily infected by dwarf mistletoe from the overstory





sources. Trees that are continuously infected from the overstory sources will be severely infected and suppressed and will not become suitable replacement overstory trees.

#### Management Alternatives:

1. Do nothing. The live boles of the marked trees will probably be attacked by western pine beetles this summer. Additional trees in the campground may be attacked also. Additional beetles will be attracted by the aggregating pheromone released by the attacking beetles. These additional beetles may attack other pines within a 20-25 ft. radius of the pheromone source.

The basal area/acre will continue to increase over time in the campground, thus increasing the level of stress the trees are already experiencing. Mortality of the ponderosa pine overstory will continue during future dry conditions.

2. Removal of marked trees. Removal of the marked trees before the lower boles are attacked will eliminate potential sources of the western pine beetle aggregating pheromone that would be released when these trees come under attack. Reducing the pheromone source by removing these trees before they are attacked has the potential to prevent future group kills. The only benefits to be gained from removing the trees which are completely dead will be to improve appearance and reduce the liability and hazard to humans. Additional mortality can be expected during 1991 due to the continuing dry weather.

3. Vegetation Management. Thinning the trees in the campground to a basal area of about 150 sq. ft./acre will promote stand health and increase tree vigor. This may allow some of the selected overstory pines to survive for many more decades.

When selecting trees for removal, the level of dwarf mistletoe in a tree and the ability of an individual tree to spread the disease should be considered. Appropriate guidelines should be included in the prescription.

Thinning may also improve the health and increase survival of the native hardwood species. However, thinning or other site disturbances during this drought period may temporarily increase the level of stress the leave trees are subjected to. Postponing thinning until precipitation returns to normal may provide greater long-term benefits.

In addition to thinning trees, dwarf mistletoe management actions can be taken to reduce the effects of this pathogen on tree vigor. Because witches' brooms are significant nutrient drains, their removal from a tree can reduce a large factor of stress. Broom pruning has been practiced successfully in a number of recreational areas in California. The longevity of selected trees can be increased by several decades if the brooms are removed. Certain criteria need to be followed when selecting trees for treatment to ensure success. Disease suppression funding is available from FPM for this activity. We can supply more detailed information on the funding process, selective criteria, and





implementation, if the District is interested in implementing dwarf mistletoe management.

If pines which still have moist cambium are cut, the slash could be used as breeding material by pine engraver beetles, Ips spp. Ips spp. will breed in portions of mainstems that are >3 inches in diameter. During warm parts of the year pine engravers may complete their life cycle in less than 45 days. Slash created between January through June is highly susceptible to infestation by Ips beetles. Subsequent build-ups in beetle population levels greatly increase the probability of the leave trees being attacked. If slash >3 inches in diameter is created during this high-risk time (January-June), it should be removed from the site, or if left on-site it should be burned. If the slash is left as firewood for the campers, it should be burned within 45 days after it is cut. Slash created from July through December will have a lower risk of pine engraver infestations occurring in the leave trees. However, because of the value associated with trees in a campground, the use of methods to prevent subsequent infestations are encouraged throughout the year.

If you would like to discuss these comments or need further assistance we can be reached at (916) 246-5087.

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